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Investigating of the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions

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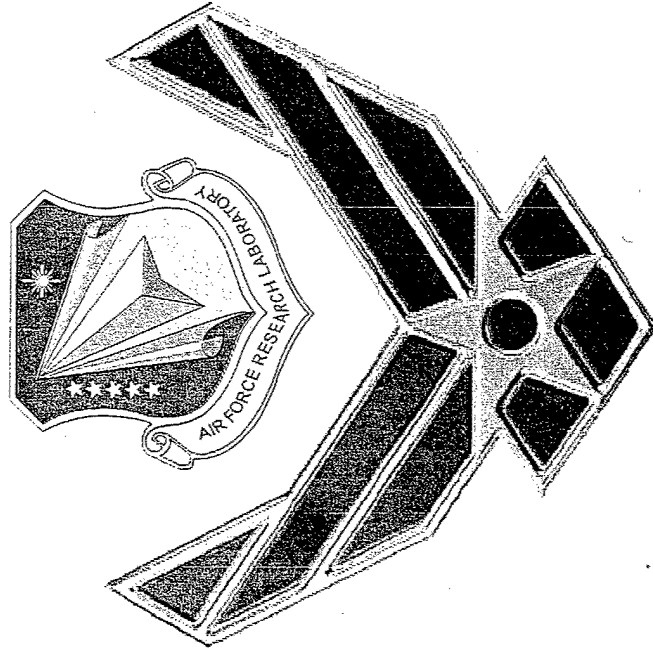
23 Apr 2003

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5642 C.T. Liu, "Investigating the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions"

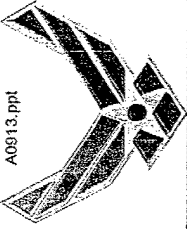
**International Conference on Mechanical Behavior of Materials
(Geneva, Switzerland, 25-29 May 2003) (Deadline: 14 May 2003)**

(Statement A)

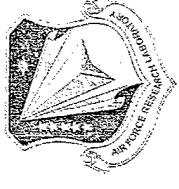
Investigating the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions.



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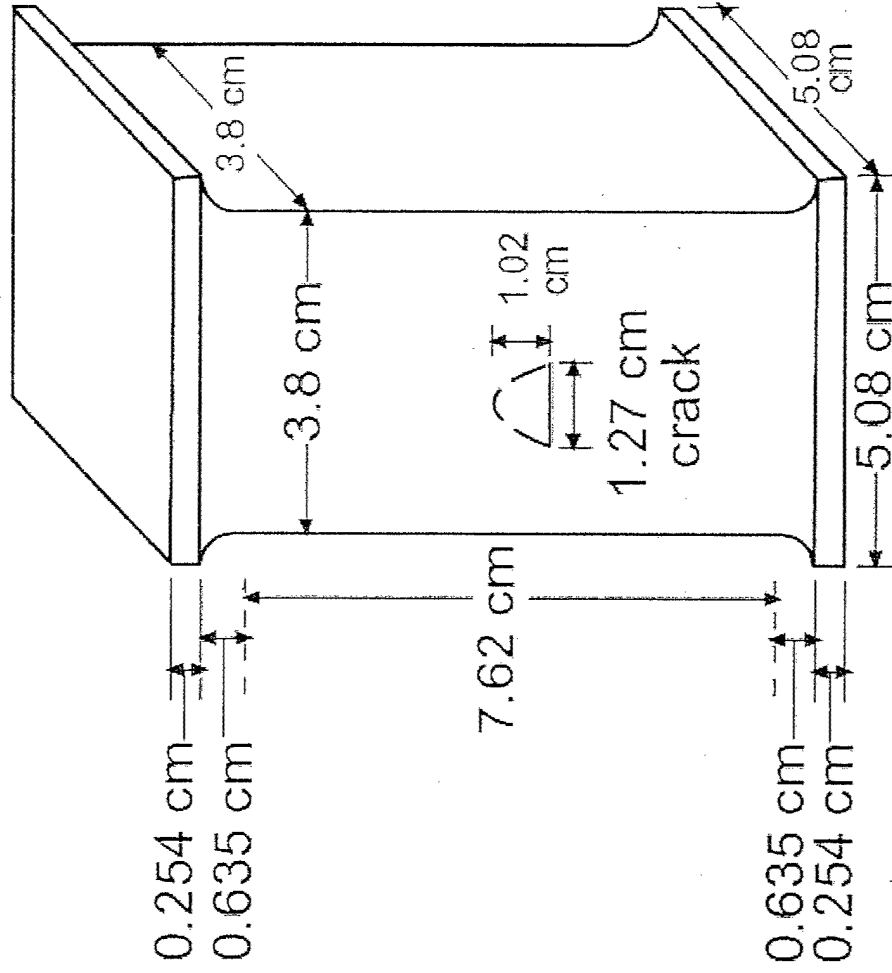
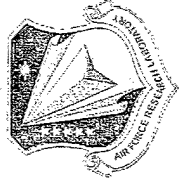


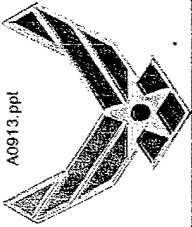
Objectives



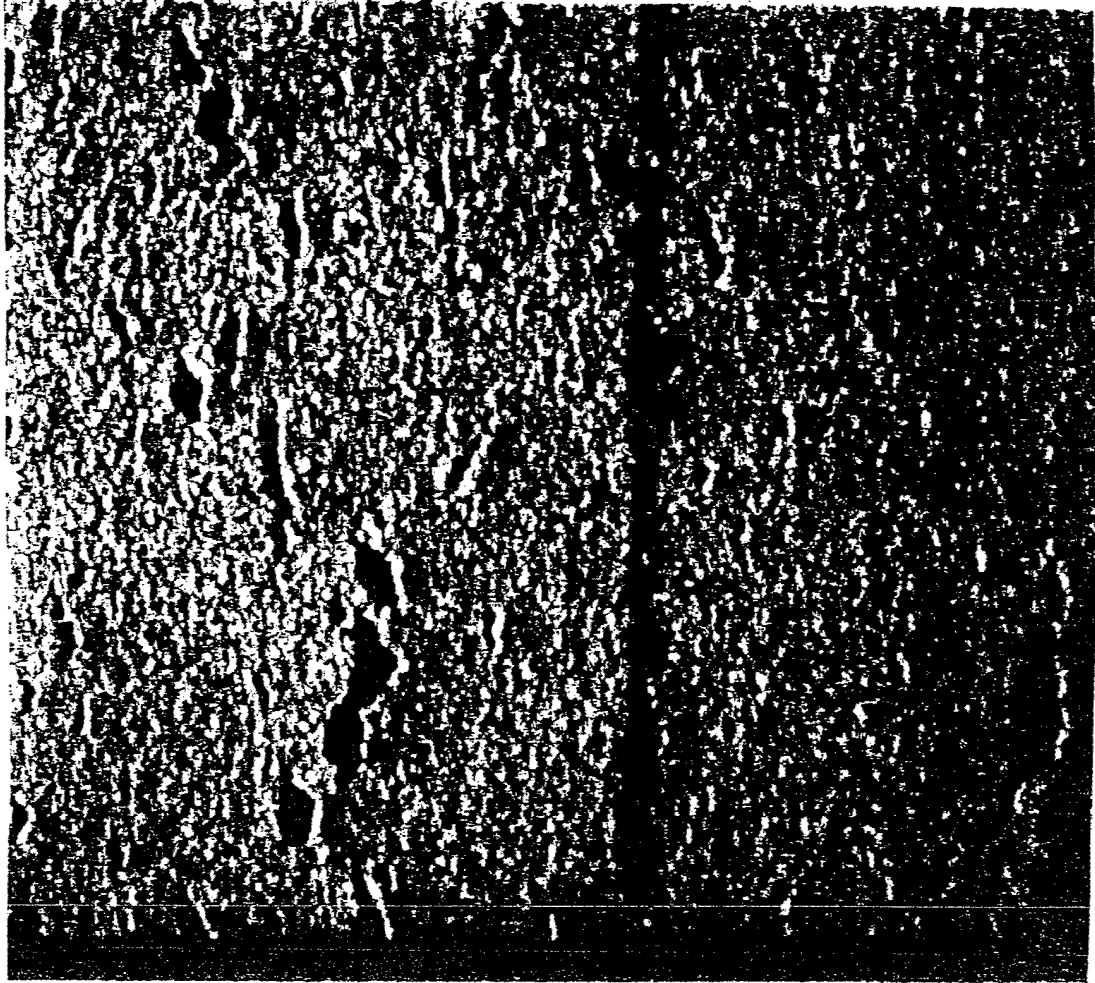
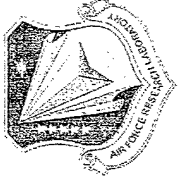
- Investigate the Effect of Loading Conditions on the Crack Growth Behavior in a Particulate Composite Material under Confining Pressure
- Loading Conditions:
 - Constant Strain Rate: 5.8 cm/cm/min
 - Constant Strain: 12%, 15%, and 18%.
 - Confining Pressures: Ambient and 6897 Kpa

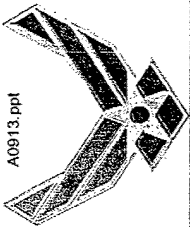
Specimen Geometry



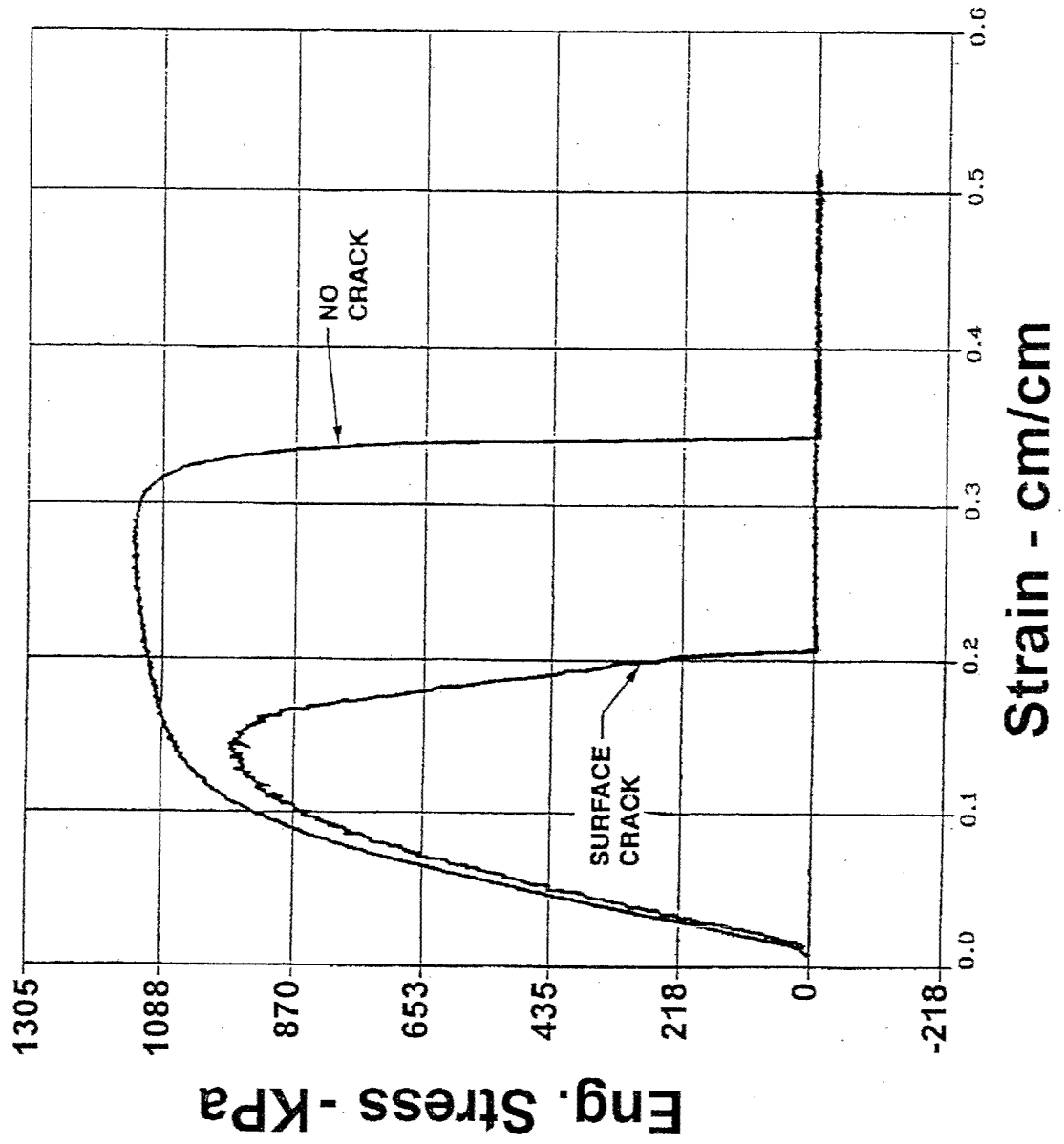
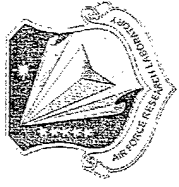


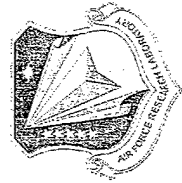
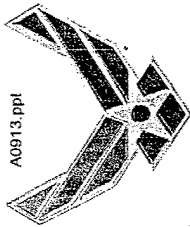
Microcracks in the Specimen under Pressure



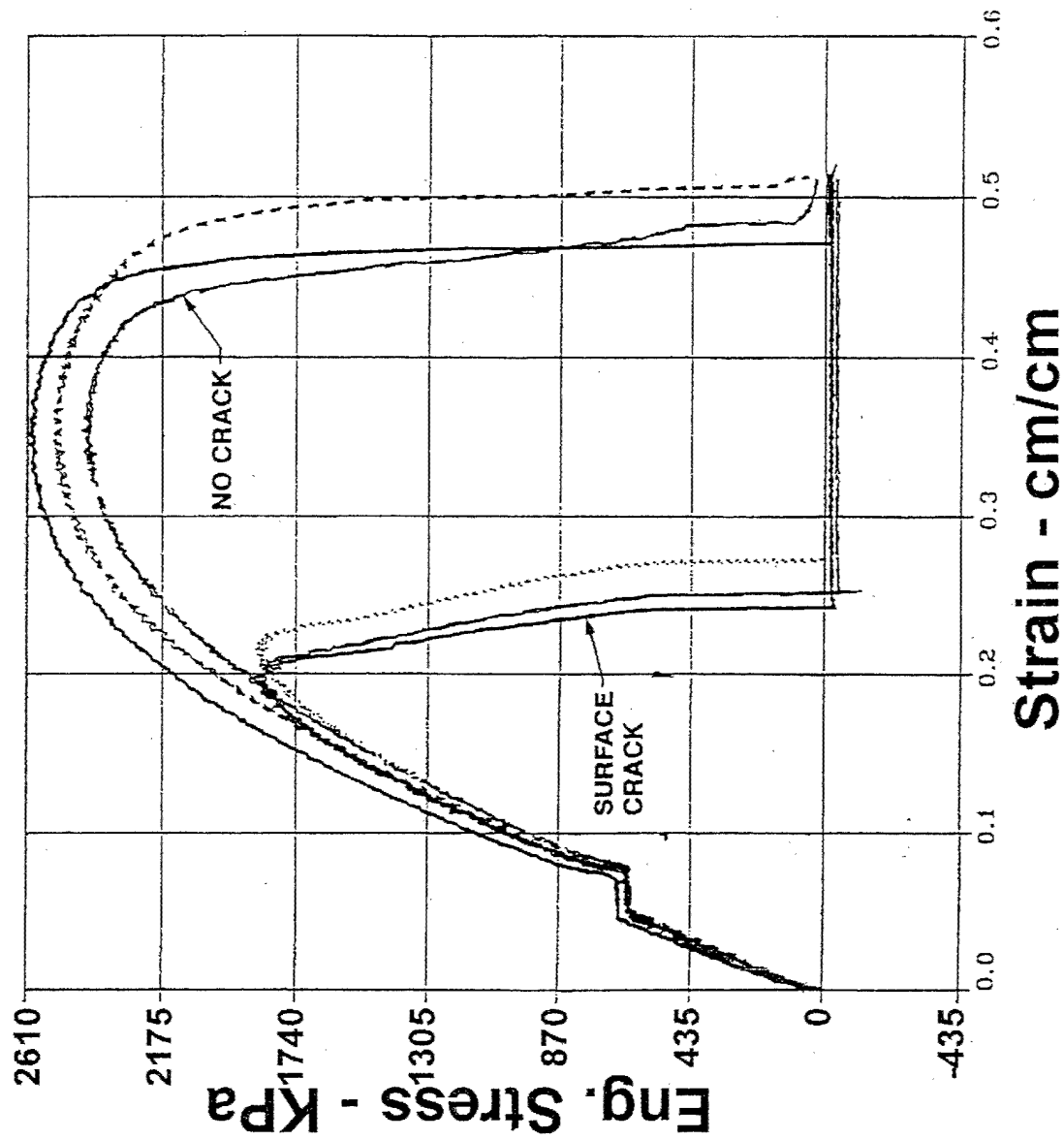


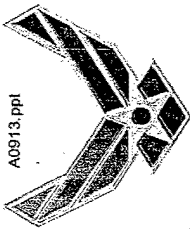
Engineering Stress Vs. Strain (Ambient Pressure)



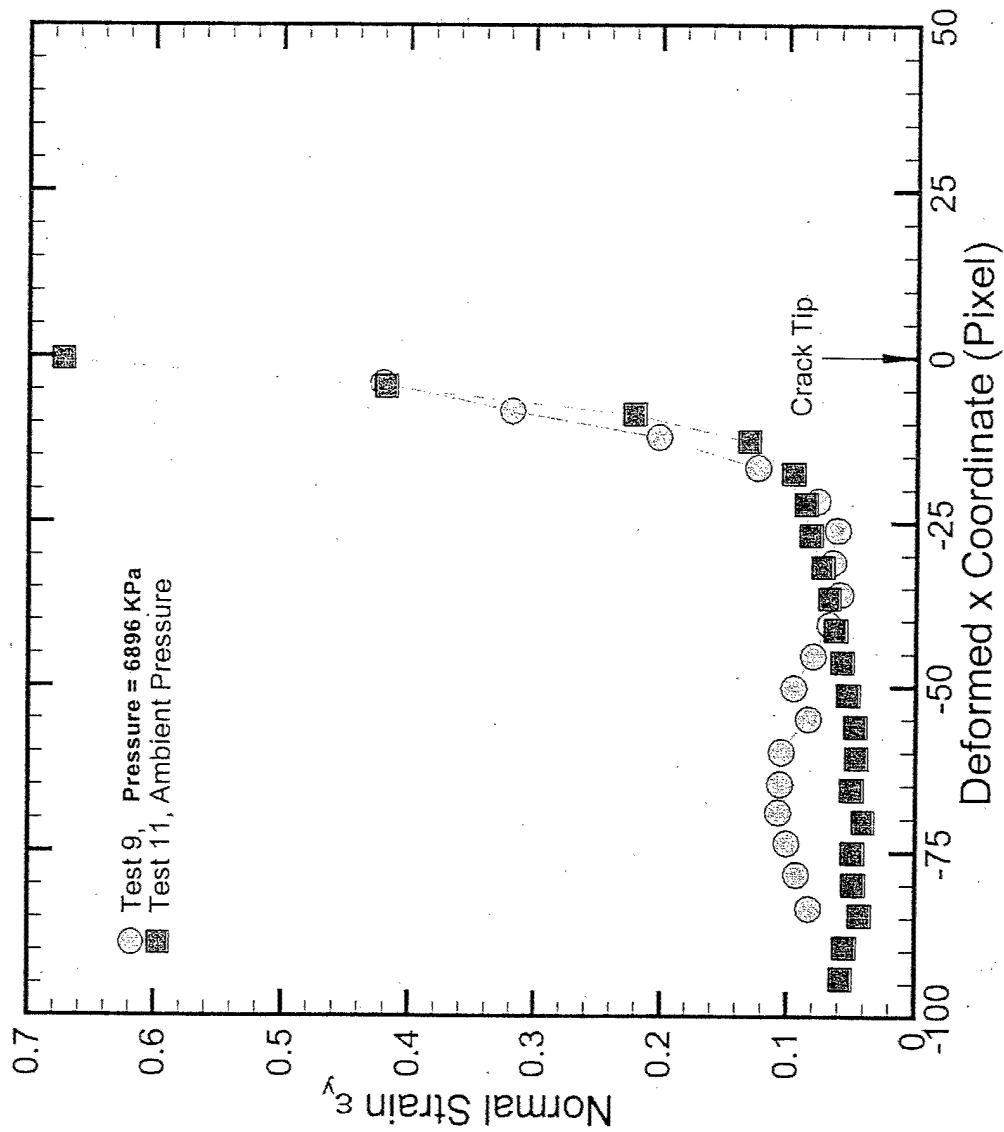
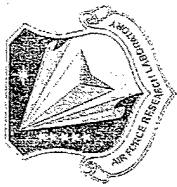


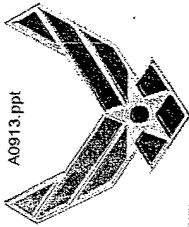
Engineering Stress Vs. Strain (6897 Kpa Presure)



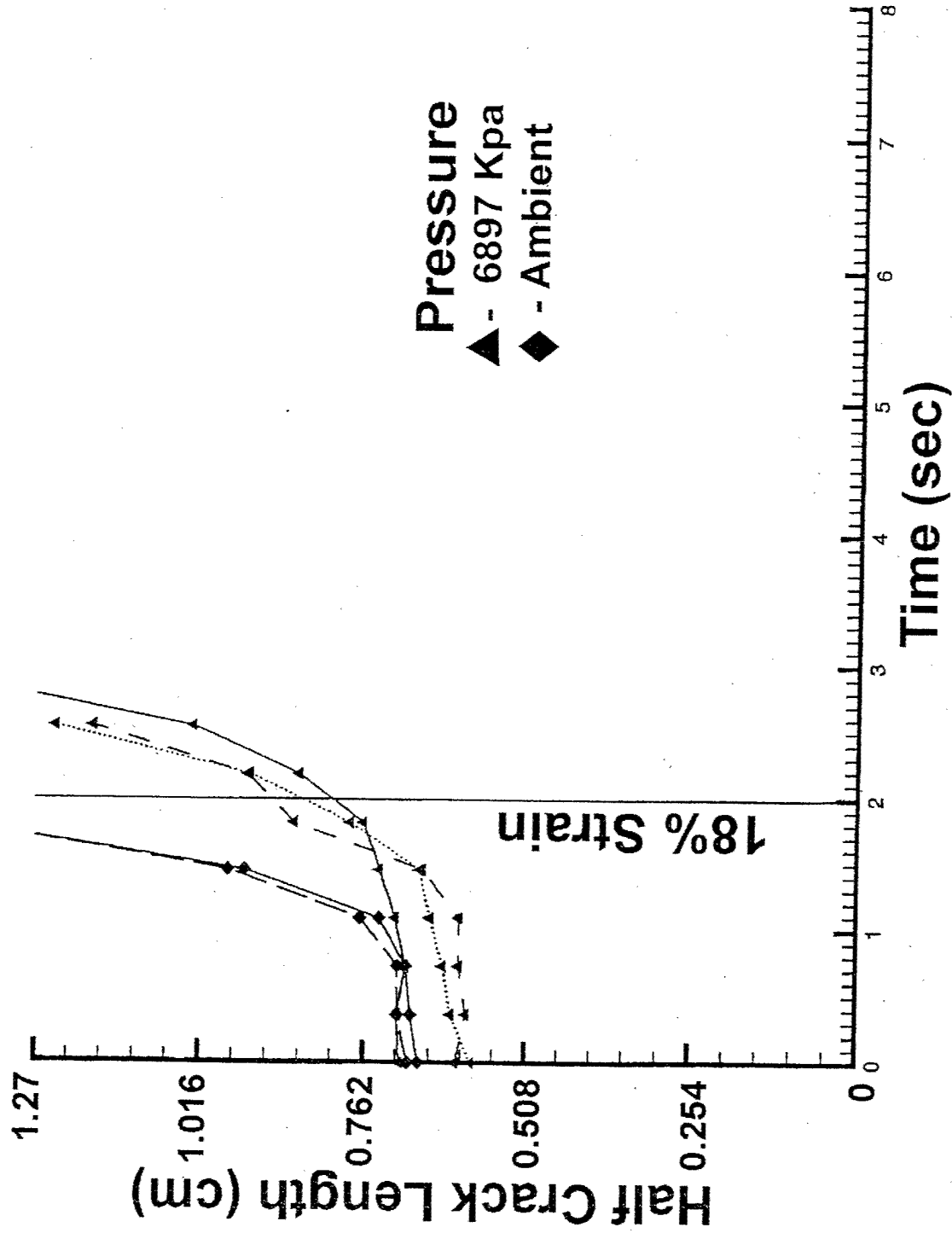
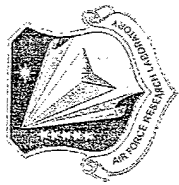


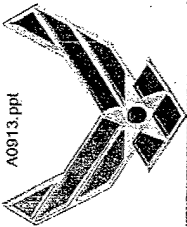
Normal Strain Distribution Ahead of the Crack Tip at the Onset of Crack Growth





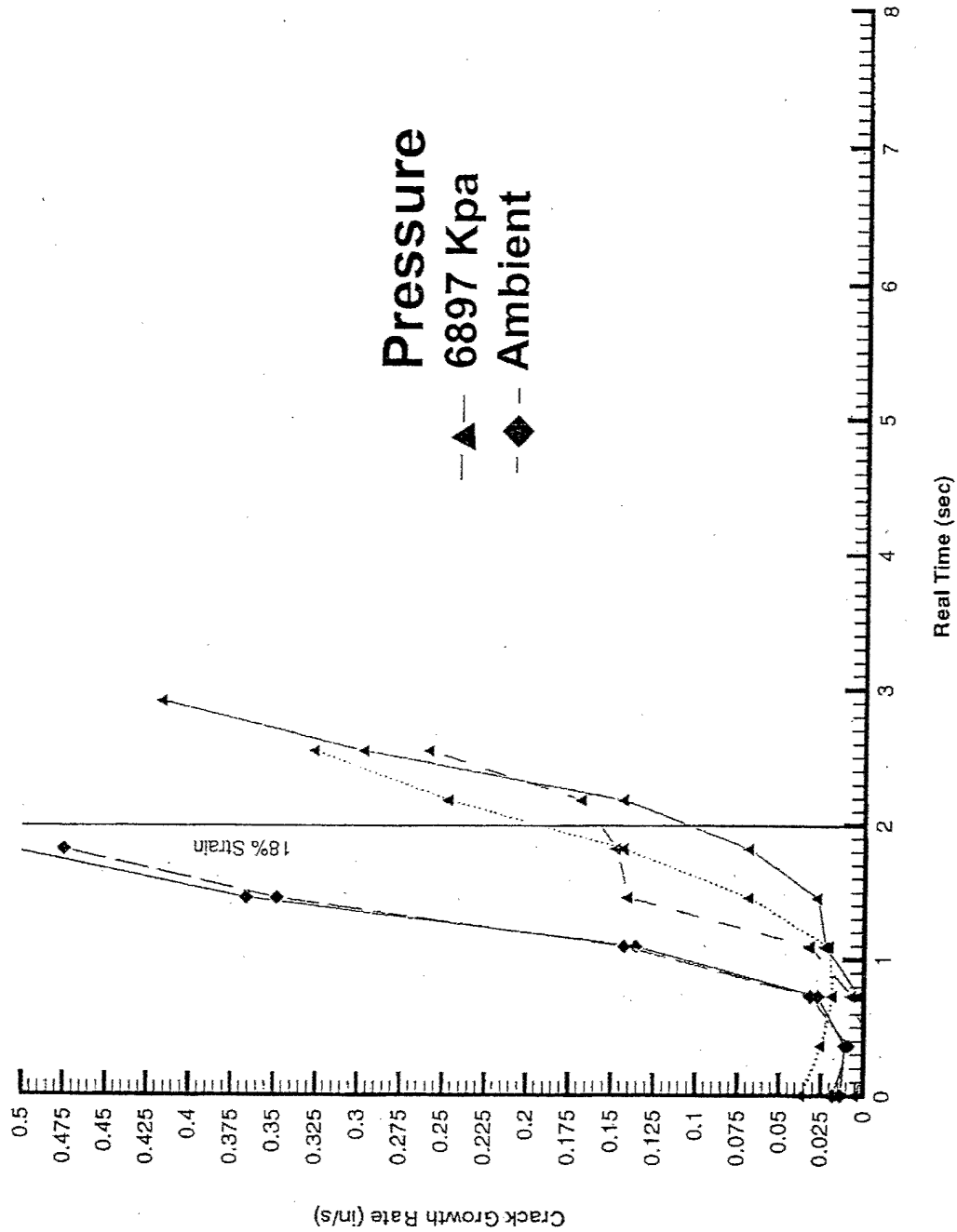
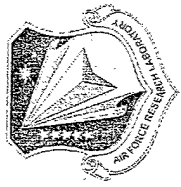
Half Crack Length Vs. Time (Constant Strain Rate Condition)

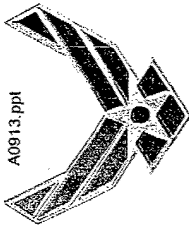




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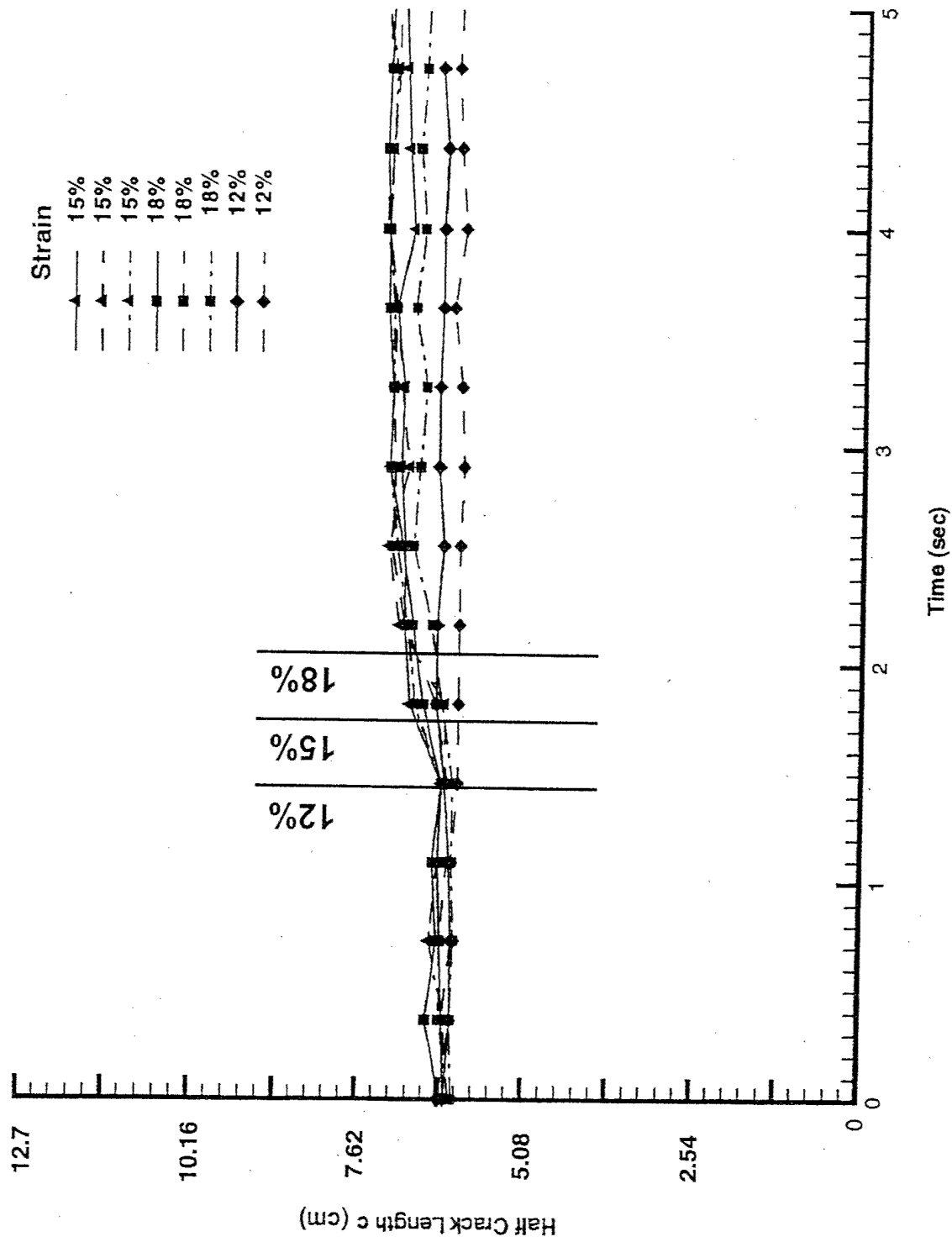
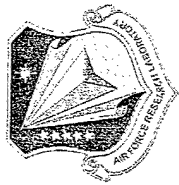
Crack Growth Rate Vs. Time (Constant Strain Rate Condition)

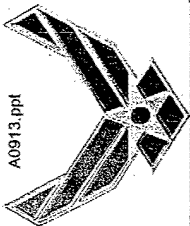




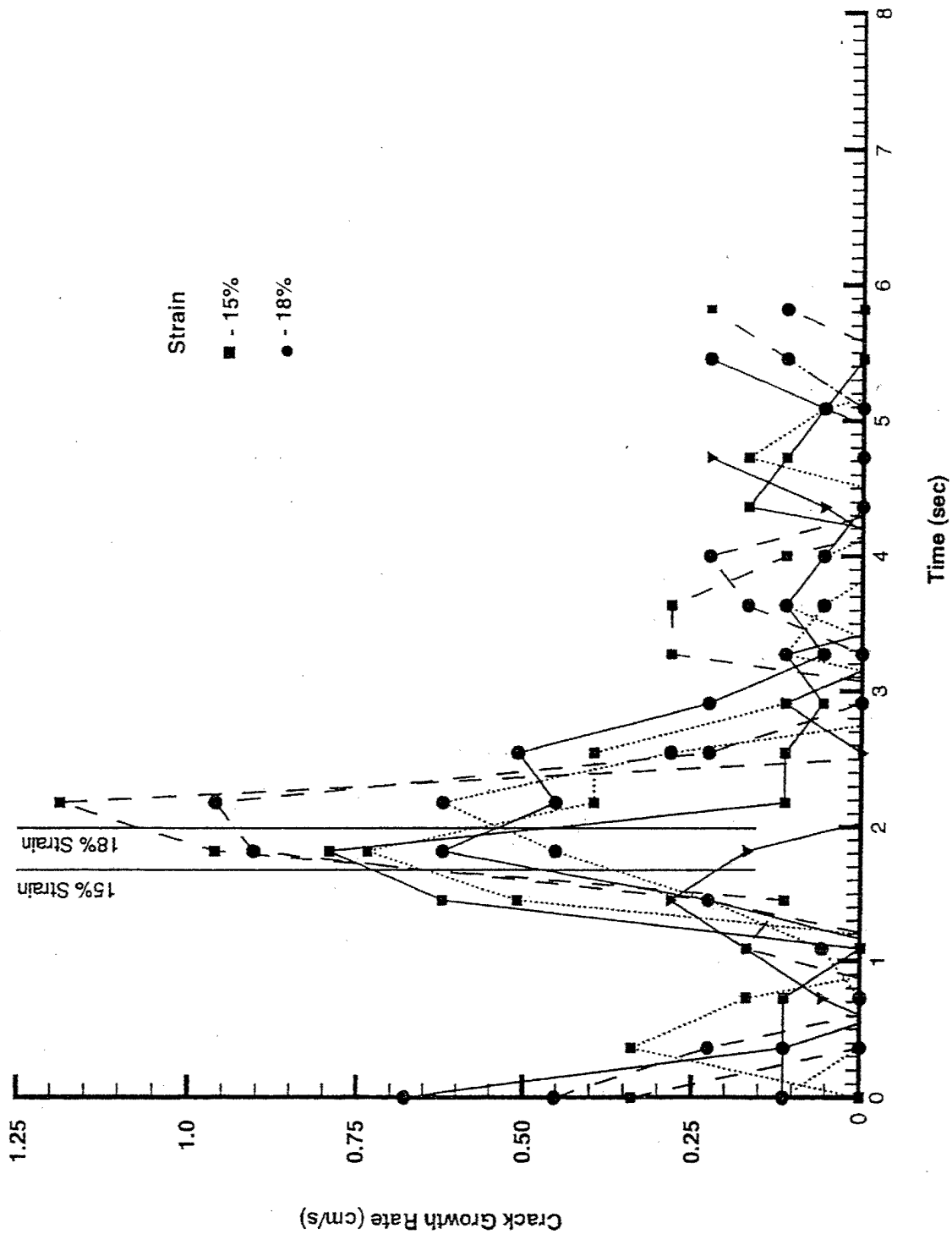
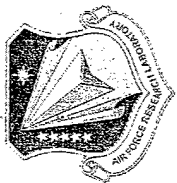
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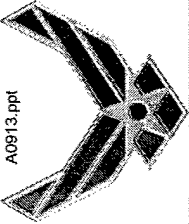
Half Crack Length c Vs. Time



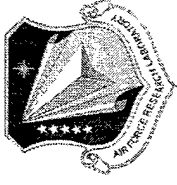


Crack Growth Rate Vs. Time





Conclusions



- Under constant strain rate condition, the crack growth rate under ambient pressure is significantly higher than that under 6897 Kpa confining pressure.
- Under constant strain condition, in general, the crack growth rate decreases as the applied strain level is decreased.
- Under constant strain condition, the crack stops growth after it propagates a short distance.
- At the onset of crack growth, confining pressure has no significant effect on the size of the high strain region.